

PATENT
52201-0650

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants : Thomas Bogdahn, et al.
U.S. Serial No. : 10/581,760
Filing date : June 5, 2006
Title : VERTICAL DRAWING METHOD FOR PRODUCING A
CYLINDRICAL GLASS BODY AND DEVICE FOR
CARRYING OUT SAID METHOD
Group Art Unit : 1791
Examiner : Cynthia Szewczyk

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PRE-APPEAL BRIEF REQUEST FOR REVIEW

SIR:

Applicants respectfully request reversal of the rejection of all pending claims in the office action dated November 18, 2010, in the above-captioned application.

General Description of Invention: The present invention is directed to methods of drawing a cylindrical glass body from a glass cylinder that is heated in a vertically-oriented heating tube.

The applicants have noted that the position in a horizontal plane (the xy-position) of the glass cylinder inside the heating tube has a decisive influence on the quality of the glass body obtained. See present published application, US 2007/0119214 A1, para. 0004. The claimed methods are all directed to drawing a glass cylindrical body from a

glass cylinder located in a preferable xy-position during the drawing process, resulting in a superior drawing process.

Independent claim 1 recites a method wherein a glass strand is drawn from a glass cylinder whose longitudinal axis is located in a corrected xy-position derived by an adjusting operation. The adjusting operation comprises drawing a tubular test strand in a first xy-position, and includes inter alia the following steps:

- a) measuring an actual state of *a radial circular or annular dimension* of the test strand, comprising measuring a wall thickness of the tubular strand;
- b) determining deviation *of the actual state and a desired state of the circular or annular dimension*, and
- c) calculating a corrected xy-position *on the basis of* a correction factor and *the magnitude and position of the deviation*, such that heating of the glass cylinder is improved.

No reference describes calculating an annular or circular deviation and a determination of a corrected xy-position based on such a deviation.

Claim 1 (and its dependent claims 2, 5 to 11, 18 and 19) have been rejected as obvious based on an argued combination of U.S. patent 6,098,428 to Bogdahn et al. (herein “Bogdahn”) with U.S. patent 6,742,363 B1 to Yamamura et al. (herein “Yamamura”).

Neither of these references shows or suggests the step of calculating a corrected xy-position on the basis of a deviation of an actual state and a desired state of a circular or annular dimension.

Bogdahn shows a drawing process in which a wall thickness measuring device

(11 in Fig. 1) derives the wall thickness of the tube as it is drawn and this measurement is used to set control variables of (1) the internal blowing pressure inside the tube to control the outer diameter of the tube, and (2) the speed of drawing to control the cross-sectional area of the tube being drawn. See, Bogdahn col. 11, lines 32 to 37. These are the only two variables controlled based on geometry of the tube being drawn.

In a second embodiment, seen in Fig. 2 of Bogdahn, a solid rod is drawn, in which case the drawing rate is controlled to obtain the desired diameter of the fiber 26. See, Bogdahn, col. 14, lines 50 to 53.

Nothing in Bogdahn suggests adjusting the xy-position of the object being drawn.

Yamamura shows an apparatus in which an elongating mechanism 140 draws a glass rod from glass material 102 in an elongating furnace 130. See Yamamura col. 6, lines 44 to 58. At setup, a hanging mechanism 134 and the elongating mechanism 140 are put in position so as to align with the vertical elongating axis 154, i.e., the vertical centerline through the elongating device of the device. See Yamamura col. 8, lines 1 to 16.

During the elongation process, a position control unit 158 “calculates” a deviation between the center of the rod as it is taken off and the elongating axis 154 (or center line). Yamamura col. 10, lines 6 to 9. Where there is deviation from the centerline, the speed of the rollers 144a and b is corrected to bring the rod back to the vertical centerline 154. See col. 10, lines 9 to 16.

Yamamura shows a calculation of the deviation between the position of the rod and the centerline of the elongating device. The deviation from centerline of Yamamura is not a determination of a deviation of an actual state of a circular or annular dimension

from a desired state of that circular or annular dimension, but simply a deviation of distance from the center, not a circular or annular dimension.

Neither is the deviation calculated in Yamamura a calculation of a corrected xy-position on the basis of the magnitude and position of a circular or annular deviation, because there is no corrected xy-position calculated. The corrected position sought by Yamamura is the predetermined centerline of the apparatus, not a new xy-position determined based on an annular or circular deviation in which the heating of the cylinder is improved.

Even if the Bogdahn and Yamamura references were combined, the result would only be a tube drawing apparatus as in Bogdahn where Yamamura's position control unit controls the rollers to pull the tube back to the centerline if it detects a bend over its length. No other proper combination may be made from the references. The urged combination would not remotely suggest the method of claim 1, as it lacks a determination of a deviation of an annular or circular dimension, and lacks a determination of a corrected xy-position based on the deviation.

Both of the steps of determining an annular or circular deviation and determining a corrected xy-position based on the annular or circular deviation are required by claim 1, and neither step is shown or suggested by either Bogdahn or Yamamura. The rejection of claim 1 and its depending claims is therefore incorrect, and its reversal is respectfully requested.

Independent Claims 20 and 25 and their dependent claims

Independent claim 20 recites a method for drawing a glass body from a glass cylinder in which a tubular test strands is drawn, and a deviation from a desired value of a

geometrical attribute including data indicative of lopsidedness derived from measurements of wall thickness, and then derives a corrected xy-position from that deviation.

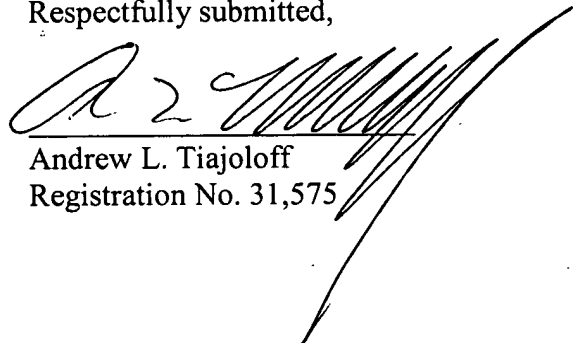
For reasons similar to those above with respect to claim 1, claim 20 recites elements that are not found in either Yamamura or Bogdahn, and reversal of its rejection, and the rejection of its dependent claim 24 is respectfully requested.

Independent claim 25 recites a method in which a geometrical property of the test strand indicative of a deviation from a desired circular or annular state is measured, and an adjusted xy-position with improved heating is determined from the measured geometrical attribute.

As discussed above, Bogdahn is silent as to any change in the xy-position. Yamamura calculates a deviation of the rod position from centerline, but this is not a determination of an adjusted xy-position for improved heating based on such a measured geometrical attribute.

Reversal of the rejection of claim 25 and its depending claims 26 to 33 is therefore also respectfully requested.

Respectfully submitted,



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